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AUTHOR Thomas, R. Murray
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ABSTRACT

A three-stage model to diagnose and treat learning difficulties is presented. The three stages include: status assessment; cause estimation; and treatment recommendations. This paper concentrates on the first part of the second stage--that of generating likely causes for the learning difficulties in a given case. A list of questions is offered to apply the composite theory to diagnose a student's learning disorder. This sequence of questions is based upon biological-genetic foundations; processing information; expectations, models, and consequences; as well as the learner's self-concept and intentions. A brief description is given of four methods to evaluate cause: (1) an analysis of the student's performance pattern at the status-assessment stage; (2) observation of symptoms; (3) the administration of tests; and (4) the conduct of interviews with the student and with others (parents, teachers, counselors, medical personnel, etc.). (PN)

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A SCHEME FOR GENERATING CAUSES OF LEARNING DIFFICULTIES

R. Murray Thomas
University of California, Santa Barbara

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A Scheme for Generating Causes of Learning Difficulties

R. Murray Thomas
University of California, Santa Barbara

Over the past three decades I have become convinced that a great many of the people who attempt to diagnose and treat learning difficulties do so without a suitable model to guide their efforts. As a result, they are inefficient in their task. The purpose of this paper is to suggest a three-stage model that I believe can improve efficiency.

To provide an introductory overview, I shall first describe the three stages. And because there is too little time to explain the details of all three stages, I shall subsequently concentrate only on the first part of the second stage —that of generating likely causes for the learning difficulties in a given case.

A Three-Stage Diagnosis-and-Treatment Model

The model is organized around a sequence of three questions that represent a kind of common-sense logic.

STAGE 1: Status Assessment: In the various aspects of the school's program, what discrepancies or gaps exist between (a) what the pupil is expected to achieve and (b) what he or she actually is achieving?

STAGE 2: Cause Estimation: Why does the pupil exhibit the particular pattern of strengths and weaknesses discovered at Stage 1?

STAGE 3: Treatment Recommendations: In view of the causes proposed at Stage 2, how can we best aid the pupil in overcoming or in compensating for the learning difficulties?

For each stage, three steps of activities are defined in the form of more specific questions. The second step in each case is that of selecting or creating appropriate evaluation techniques.

The questions defining the three steps at the status-assessment stage are:

Step 1.1: Learning Objectives What are the specific objectives the student is expected to have reached by the present time? (The diagnostician specifies the learning outcomes the student will have mastered in order to be judged as progressing satisfactorily or normally for a person of his or her age.)

Step 1.2: Evaluation Methods What assessment techniques can be used to determine how well the student has achieved the objectives under 1.1? (The diagnostician selects or creates evaluation methods to assess for

each objective.)

Step 1.3: Student's Status After the assessment techniques have been applied, what pattern of discrepancies between the expectations and the performance shows up? (The strengths and weaknesses in the student's profile of achievement are summarized.)

Once the pattern of strengths and shortcomings in the student's performance for the entire array of learning goals has been discovered, the diagnostician seeks to learn the causes for such a pattern. The questions defining the three steps of this cause-estimation process are:

Step 2.1: Possible Causes What are possible reasons that the student is deficient in the ways revealed in Stage 1? (The diagnostician speculates about what factors in the pupil's life might have produced the particular profile of strengths and weaknesses in school achievement. If these factors can be discovered, the teacher or psychologist is in a good position to apply a profitable treatment at Stage 3 to correct the causes or at least to minimize the learning deficiences resulting from such causes.)

Step 2.2: Evaluation Methods How can the possible causes from Step 2.1 be assessed in order to determine which of them are the most likely or most potent influences on the achievement pattern the student displays? (The teacher or psychologist obtains or creates evaluation methods that will indicate which of the estimates of possible causes are the most likely and most influential.)

Step 2.3: Most Likely Causes After the evaluation methods suggested at Step 2.2 have been applied, what conclusions can be drawn about the most likely causes? (The diagnostician describes which causes have apparently exerted a stong effect on the student's condition, which ones have been less important, and which of the possible causes are not really causes at all in this case.)

The third stage of the process, that of treating the learning deficiences, consists of three steps defined by the following questions:

Step 3.1: Treatment Desciption What techniques of treating students or of altering their environment will probably be most successful in helping them conquer their learning deficiency? (The teacher or psychologist proposes ways of changing the student or changing the social/physical environment that will best solve the learning difficulty.)

Step 3.2: Evaluation Methods What evaluation techniques can be used to determine how well the treatment is succeeding? (In most cases the same evaluation techniques used for status assessment at Step 1.2 will be appropriate for assessing the progress of the treatment.)

Step 3.3: Conclusions about Treatment Effectiveness What does the evaluation tell about the success of the treatment? (A decision is reached about whether the treatment is working well enough to continue it, or whether it should be abandoned or altered in favor of a different approach. If the treatment is judged unsatisfactory, the diagnostician either returns to Stage 2 to reappraise the likely causes of the problem or else reexamines Step 3.1 to decide if the treatment has actually been implemented as originally intended.)

Whereas the nine steps described above form the complete picture of the diagnostic and treatment scheme, in the present paper I have chosen to focus on only one of the steps, that of generating possible causes of learning difficulties (Step 2.1). At the close I shall also comment briefly on Step 2.2, that of selecting appropriate methods for evaluating the cause possibilities.

Generating Cause Possibilities

Some diagnosticians —be they psychologists, counselors, or teachers— appear to derive their estimates of causes from a single theoretical perspective. Their viewpoint may be that of psychoanalysis, of behaviorism, of perceptual-motor theory, of humanistic psychology, or of some other model. But I am convinced that deriving cause estimates from only one of these perspectives is too restrictive and often leads to unprofitable treatment recommendations. A broader theoretical departure is needed, I believe, to produce an accurate estimate of the complex causes that underlie many learning problems.

Other diagnosticnas, in contrast, do not limit themselves to one theoretical approach. Instead, as eclectics they draw ideas from a variety of sources. But too often their approach is unsystematic. The danger of unorganized eclecticism is that important aspects of cause may easily be overlooked. The result can be a hodge-podge of cause possibilities that fails to provide a sound foundation on which to base a coordinated treatment plan.

What I am suggesting is that a composite theory of cause, which draws on several individual theories, offers a more comprehensive, systematic scheme for generating cause estimates than does either a single theory or unorganized electicism. The composite theoretical approach that I am advocating is fashioned from a biological-genetic model, information-processing theory, social-learning theory, and humanistic psychology. Although this combination does not encompass all cause possibilities found in present-day thinking about learning difficulties, I believe it accommodates the most common possibilities and, at the same time, is not so complex that it cannot readily be kept in mind by a classroom teacher, psychologist, or school counselor. The elements of the composite theory can form a mental check list through which the diagnostician progresses while seeking the reasons for a student's learning disorder.

The theory, in over-simplified form, is graphically represented in Figure 1 as consisting of two major segments. The rectangle at the right, delineated by the heavy borderline, is the person. At the left is the physical and social environment with which the person interacts. The base of the rectangle is pictured as the individual's biological foundation, consisting of genetic inheritance, rate of maturation, past physical conditions, and the present chemical or nutritional state of the body. Causes of learning deficiences can be seated in any of these aspects of the biological foundation.

Placed above the biological base in Figure 1 is the psychological individual, the aspect of a person referred to by such diverse terms as mind, personality, cognitive structures, memory, and intervening variables. The elements shown in this portion compose an information-processing system, whose direction of flow —in over-simplified form— is suggested by the arrows. To begin, the person receives stimuli from the environment through the sense organs. The sense impressions are next filtered, coded, and interpreted in short-term memory. Then certain of the impressions are stored as information in long-term memory. When the need arises, the stored information is retrieved, and the person acts on the world —giving a speech, writing answers on a test, operating a computer, kicking a ball, or the like. Problems occurring at any point in this process can result in learning difficulties.

In learners' transactions with their world, other people in their environment hold goals for them to reach. Others also provide models of behavior to imitate, and others reward and punish the learners' behavior. The cause of learning deficiencies can reside in any of these acts. Social-learning theory offers useful ways of analyzing such acts and of correcting or mitigating the learning damage they produce.

The long-term-memory portion of Figure 1 has a variety of contents, including the person's goals and self-concept. In some instances, learning difficulties can be interpreted as arising from students adopting unsuitable goals or from their holding a distorted, unproductive perception of self. Humanistic psychology has provided methods for aiding those whose learning problems derive from such causes.

With this introductory overview in hand, we now consider a sequence of questions about possible causes that a diagnostician can have in mind —a kind of check list— in applying the composite theory to the task of generating possible causes of a student's pattern of learning difficulties.

A Sequence of Questions about Possible Causes

Biological-Genetic Foundations

The underlying cause of an individual's learning deficiencies is sometimes found in the person's having received an unfavorable combination of genes from the parents at the time of conception. Consequently, one

question on the diagnostician's check list should be: "How likely is it that the student's genetic inheritance is a cause underlying the observed pattern of learning difficulties?"

The genes not only set the plan for a person's biological architecture, but they also establish the time when certain physical and mental potentials will ripen, so that one of the chief problems faced in teaching groups of children is that their genetic time clocks do not all run at the same speed (Piaget and Inhelder 1969). Therefore it is useful for the diagnostician to ask: "Is it likely that the learning difficulties are caused, at least partially, by a poor match between the teaching and the student's rate of maturation?"

At any time after the child's genetic potential has been set at the moment of conception, accident or disease can affect development in ways that contribute to present learning deficiencies. Thus we can ask: "Are there residual effects of past accident or disease that contribute to the student's learning difficulties?"

When we perceive humans as electro-chemical organisms that operate efficiently only if they receive a sufficient supply of fuel and maintain a proper balance of chemical substances among all of their interacting parts, then we can profitably ask: "May a disorder of body chemistry, as a result of inadequate nutrition or of ingesting poisonous substances, be causing the learning deficiency? Or does a lack of rest and relaxation or a lack of suitable exercise contribute to the deficiency?"

Processing Information

In Figure 1 the information-processing cycle is pictured as progressing (1) from environmental stimuli, (2) to the sense organs, (3) to interpreting sense-impressions in short-term memory, (4) to storing the information in long-term memory, (5) to retrieving information from long-term memory, and finally (6) to directing the muscles to act. Learning difficulties can arise from disorders at any stage of this process. The general question the diagnostician obtains from this aspect of the theory is: "Where in the information-processing cycle might there be a deficiency that has contributed to the student's learning difficulty." Under this general question, a series of more specific ones can be posed about the opportunities for learning provided by the environment, the efficiency of the sense organs, the efficiency of visual- and auditory-peception mechanisms in short-term memory, the method of storing information in long-term memory, the method of retrieving information from memory, and the effectiveness of the efferent nerve system in directing the muscles to act.

Expectations, Models, and Consequences

Social-learning models furnish a theoretical viewpoint for diagnosing learning difficulties that arise from the social environment's influence on the learner. Three key principles common to most versions of

social-learning theory relate to the expectations others hold for the learner, the models available for the learner to copy, and the consequences resulting from the learner's behavior.

In at least two important ways, other people's expectations can contribute to a student's learning problem: (1) when the goals are unreasonable, so the student is unable to reach them, and (2) when the student disagrees with the adult about which goals are worth achieving. Thus, our diagnostic check list can include: "Is it likely that the expectations others hold have contributed to the student's learning problem?"

Certain versions of social-learning theory (Bandura 1977) make much of the influence on students' behavior of the models students imitate. So we may ask: "To what degree may the student's learning difficulties be related to inappropriate models or the absence of suitable ones, to a lack of desire to imitate proper models, or to the student's failure to recognize which facets of the models' behavior should be copied?"

A key element of behaviorism and social-learning theory alike is the importance of the consequences that follow an act, that is, the importance of rewards and punishment in fashioning people's behavior (Skinner 1969, 1974). In common parlance, the basic principle is: "Whenever a person's behavior is followed by rewarding (reinforcing) consequences, the person will tend to repeat that same behavior in the future when faced with a similar situation. Conversely, if a behavior goes unrewarded (not reinforced) or is punished, the person will less likely try that same behavior again in a similar circumstance." Hence, it is useful to ask: "To what extent may the learner's deficiencies result from unsuitable patterns of consequences —from either an inappropriate choice of consequences or inconsistency in their application?"

The Learner's Self-Concept and Intentions

The central focus of humanistic psychology is on the development of one's *self*, with my *self* generally interpreted to mean the person I believe I am (Thomas 1985, Chap. 16). For humanistic psychologists, the causes behind learning difficulties often include the learner's self-perception and goals (Buhler and Allen 1972). These humanistic concerns, then, furnish our final diagnostic question: "How might the student's self-concept and goals be contributing to his or her learning difficulties?"

In summary, then, the foregoing list of questions, and the more detailed subquestions that can logically be derived from them, identify the pool of potential causes that a diagnostician can consider when analyzing the pattern of a student's learning performance that has been revealed at the status-assessment stage of the diganostic model.

A Note about Evaluation Methods

Although a detailed description of how to assess for all the potential causes outlined above is beyond the scope of this paper, a few closing comments can suggest some of the chief considerations involved in the assessment process.

The purpose of evaluation at this stage is to discover which of the possible causes are the most probable. The evaluation methods for accomplishing this discovery are of four varieties: (1) an analysis of the student's performance pattern at the status-assessment stage, (2) observations of symptoms, (3) the administration of tests, and (4) the conduct of interviews with the student and with others (parents, teachers, counselors, medical personnel, and the like).

The assessment process can profitably begin with an inspection of the status-assessment pattern, an activity that can initially suggest which potential causes may be least likely. These least-likely causes can then be set aside rather than investigated in detail by means of tests, observations of symptoms, and interviews. For example, a sixth-grade boy's status assessment shows that he reads only as well as an average second-grader but he reasons quite as well as sixth graders about the science experiments he observes and about social-studies issues discussed in class. In this case it is unlikely that his learning problem is seated in a general genetic deficiency that decreases his ability to interpret information and store it in long-term memory. That is, the boy is not likely what people often refer to as "a slow learner" or "mildly mentally retarded". It is more likely the problem lies in (1) a vision defect, or (2) a visual-perception disorder in short-term memory (whereas auditory perception appears to be normal), or (3) ineffective reading instruction in the past, which might have been related to the boy's possible slower cognitive-maturation rate in earlier years. Thus, it would not be appropriate to administer a general-intelligence test to measure for the boy's "general mental ability". Instead, tests of vision and visual-perception are needed. And the teacher or a reading specialist can attempt to reteach the boy basic reading skills, while observing how adequately he masters these skills. This reteaching activity would help determine whether ineffective instruction in the past contributed to the reading difficulty.

In regard to intelligence testing, it is worth noting that the typical general-intelligence test, which diagnosticians so often continue to admininster, is of little value in the model of cause-estimation described above. An intelligence quotient or mental age from a Stanford-Binet or Wechsler scale tells only how well the student answered the test questions. It fails to suggest the extent to which genetic-versus-environmental forces have been involved or to suggest where in the information-processing cycle a disorder lies. In effect, general-intelligence tests lack the diagnostic characteristics needed for guiding the teacher or psychologist to suitable treatment measures. More specific diagnostic tests and observations of symptoms are of far greater value in determining the probability of causes.

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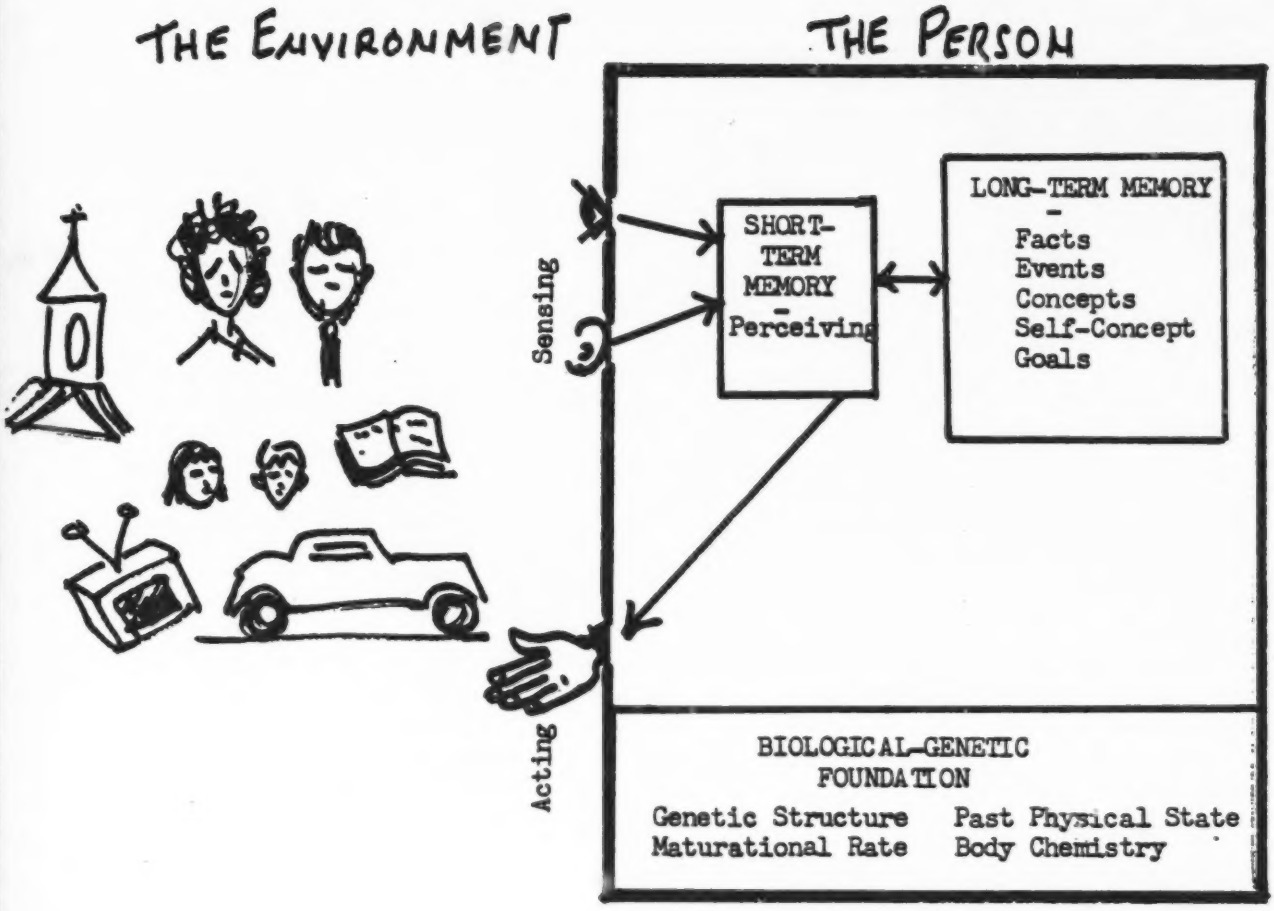
Figure 1

ELEMENTS OF A COMPOSITE DIAGNOSTIC THEORY



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